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Murphy et al.(10) **Pub. No.: US 2021/0222131 A1**(43) **Pub. Date: Jul. 22, 2021**(54) **MULTI-LAYER AIRWAY ORGANOIDS AND METHODS OF MAKING AND USING THE SAME**(71) Applicant: **Wake Forest University Health Sciences**, Winston-Salem, NC (US)(72) Inventors: **Sean V. Murphy**, Winston-Salem, NC (US); **Anthony Atala**, Winston-Salem, NC (US)(21) Appl. No.: **17/224,191**(22) Filed: **Apr. 7, 2021****Related U.S. Application Data**

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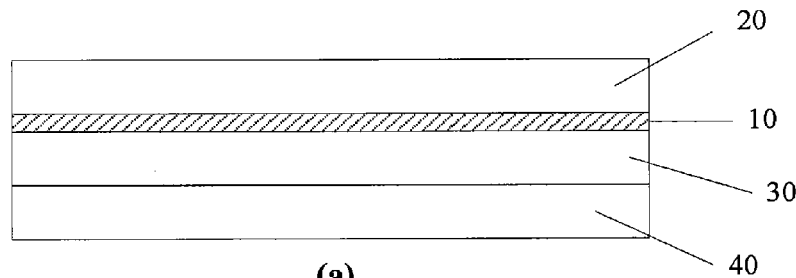
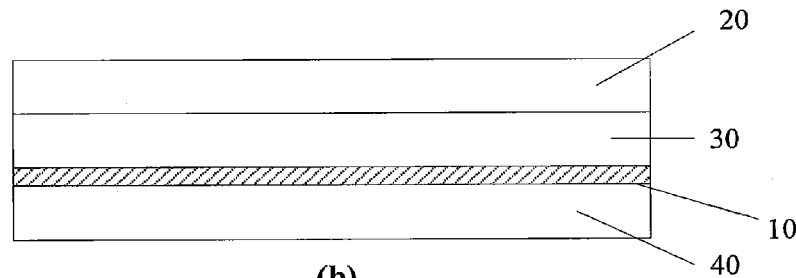
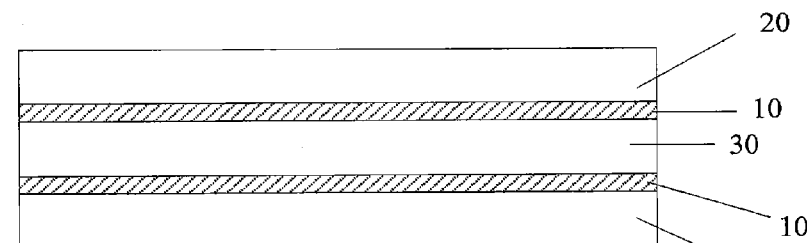
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(57)

ABSTRACT

Provided herein are artificial lung organoids. The artificial lung organoids may include an epithelial cell layer comprising mammalian lung epithelial cells, a stromal cell layer comprising mammalian lung fibroblast cells and an endothelial cell layer comprising mammalian endothelial cells. The artificial lung organoids may optionally include a porous membrane between said epithelial cell layer and said stromal cell layer and/or between said stromal cell layer and said endothelial lung cell layer.

**(a)****(b)****(c)**